Our Nuristani staff was able to master this procedure although they needed some supervision and never took the responsibility to plan and carry out the process on their own initiative. This method of maintaining a cold chain, although interesting, is too much work, is time consuming, and of course, requires snow, thus it is impractical for most vaccination programs inside of Afghanistan, unless conducted during the winter.

By October, maintaining the cold chain was no longer a problem. Daily high temperatures did not usually exceed 14°-15°C., and nightly lows were in the range of 4°-6°C. The cold box was left open outside in a protected courtyard at night, and brought into an unheated room during the day. Had we stayed longer, once it began to freeze at night, ice packs alone would have been placed out to freeze as needed. For winter campaigns, preventing the vaccines from freezing should not be a problem because wood is plentiful and heated rooms are easy to find. An unheated room sharing a wall with a heated room would probably be ideal. Of course, constant monitoring would still be required by a responsible individual who understands the risks of both heat and cold exposure.

GETTING THE WORD OUT: COMMUNITY EDUCATION AND MOBILIZATION

A vaccination program was discussed with the head of the government, Amir Afzal, at the end of the first trip to Nuristan. Later planning was conducted by letters hand carried from Pakistan to Nuristan. The government arranged for the transport of our materials to the inside by sending out 35 men to carry supplies over the pass one week prior to our crossing. However no actual community preparation was done by the local government, and the people received no command from their leader to come for vaccination (see "Problems"). The success of the campaign depended on word-of-mouth communication in most areas, and the faith of the people in the medical team.

Although initially we had planned to send a representative ahead to inform the next village, in practice this was not necessary: the communities virtually all knew of our presence from

the moment of our arrival in the valley, and in most cases, they were eagerly waiting for us and knew exactly where we were, how fast we were moving, and when we were expected to arrive in their area. Villages off the main track generally sent representatives to the Amir or to us, requesting us to come.

Upon arrival in each village, essentially the same procedure was used. The team would generally arrive in the afternoon, having walked from the previous village. In almost every village we were housed in the home of the village chief. Upon arrival, while tea was being prepared we would ask for the village elders, mullahs and military leaders to be assembled and to join us for tea. Although the response varied from village to village, in general it was good, better if we were sitting outside.

Once the men were assembled we explained why we had come, the importance of vaccination, who the target population was, and the need for follow-up and repeat vaccination. The recent measles epidemic and the eradication of smallpox were useful examples. All adults remembered the smallpox vaccinators and usually showed their scars. We explained that measles could be eliminated in the same way, but to do so, new babies would have to be vaccinated each year, not just once as with smallpox. The smallpox scar was also useful in explaining the side-effect that would be caused from the BCG vaccination.

We then asked the mullah or mullahs to announce our presence in the mosque, and we asked the men to spread the word in the village and the surrounding farms. We asked that women not go to the fields in the morning, but rather to stay in the village for vaccination. This met with variable success. We frequently saw women leaving for the fields at 6:00, when we were just getting up.

In addition, either our first or second night in each village in the Bashgul we passed house to house doing a population and measles survey. This also served to inform the people of our presence and why we had come.

Each vaccination session began with a lecture using a photo poster of the six EPI preventable diseases. The lecture, which lasted about 15 minutes, emphasized the recent measles epidemic, the effect of vaccination on childhood mortality, the need to participate in an ongoing manner with young babies coming each year. Side effects and the benefits of vaccination for pregnant women and newborns were also covered.

Although we tried to assemble the whole village for these talks, in practice this was not possible. The people simply would not come, sit down and wait. We usually started when 20-50 men and children were assembled; more people came once they saw the poster and heard us talking. Women always had to wait in a room while the lecture was given in the open air. Attempts were made to repeat the lecture for them, but difficulties were encountered because generally the translator was unwilling to address them directly.

Our general impression was that there was interest in the lecture as a visual display, and that the people appreciated our talking to them. However their participation was based not on understanding the principles of vaccination and its potential for preventing disease, but rather, on their faith in us, and the value of our "pitchcories" (shots).

Vaccination sessions were held in the mornings and sick call in the afternoons. We stayed in most villages only two days, enough for two vaccination sessions. This was not sufficient time to see most of the side effects produced by vaccination. However in most villages one or two crying babies, or older children with limp from local pain were brought in the afternoon. The children were examined, treated with paracetamol, and the parents were instructed that local pain and tenderness was normal. In most cases the parents were open and did not seem overly concerned.

CONDUCT OF THE VACCINATION SESSIONS AND THE SPECIAL REQUIREMENTS OF PURDAH: Nuristan is a very conservative area, reportedly more than many other parts of Afghanistan, and purdah has become much stronger since the war, with the influx of strangers and the influence of Arab interests. Nevertheless women are not confined to the home: they are going to the fields every day.

Although our team had two expatriate women, all of our local team members were men. We were occasionally accused of "violating purdah". This is an extremely serious charge and one that must be avoided at all costs if women are not to be excluded from access to health care. The charge also puts the local health care provider at risk, and can be the reason for termination of medical services in the area.

On arrival in each village when we met with the elders we usually discussed purdah and our desire to respect it. After the meeting we would go with a couple of village responsibles to look for an appropriate location for the morning vaccination session.

In most cases, we were able to find an enclosed courtyard with a room that let out into it where the women could wait. We tried to find courtyards with two entrances so that the flow of traffic and onlookers could be controlled. Ideally both entrances were policed by local men who would limit the number of people inside to a manageable number, and ensure that people left when they were finished. The courtyard was often divided into a registration and vaccination area by hanging up blankets. The men were very helpful in this regard and could even construct entire "rooms" made of branches and blankets in gardens in a half-hour.

Generally one man would register his entire family, be given the vaccination cards, and afterwards he would return with his family. Then the family would be vaccinated as a group, matching cards to names, and keeping back cards of people (women usually) who were registered but not present. Usually Maria or I would have to vaccinate women over 14, although there were

exceptions to this. Our Nuristani team members told us that if the local people did not have the option of having women vaccinators in the future, that many more families would accept being vaccinated by men rather than missing out entirely. This seems a little doubtful however. Getting sleeves up high enough to vaccinate was difficult and time consuming due to modesty. Sometimes the men on our team would be asked to leave the area, and they always had to be careful to have their backs turned. The most ingenious solution to this problem that I saw was in the village of Wama, where one of the village leaders who was helping us, seeing the difficulties we were having getting sleeves up, got out his pocket knife and quickly cut a tiny hole in the sleeves for the needle to go through. The women didn't seem to mind a bit!

If the village mullah was interested in vaccination we could sometimes get him to be present during the sessions. We welcomed his presence, because it gave a stamp of approval to women coming for vaccination and it helped to protect us from unfounded accusations of violating purdah. When the mullah, village chief or other responsible men got involved in helping during the sessions this made our tasks easier, and always improved the turn-out.

TRAINING OF LOCAL VACCINATORS

Developing a team of vaccinators capable of carrying out future campaigns unassisted was a priority for this mission. Establishing a network that can deliver future vaccination services is the logical extension of a mass campaign, and it is almost impossible for large enough numbers of foreign teams to enter resistance controlled areas to have an impact on the population as a whole. The E.P.I. program worldwide depends almost exclusively on trained local vaccinators.

Our team had four students. Three were from the Bashgul valley, and one was from Parun. Two of the students had been handing out pills, giving injections and pulling teeth for some time prior to our arrival, although they had never had any formal training. Another was the son of a medic who had been trained in Peshawar. The father had worked in Nuristan briefly before dying of appendicitis. The son, however had no medical experience, and neither did the fourth student from Parun. One student had finished grade 12 prior to the war. Although the others also claimed to have completed "high-school" by going out to Pakistan, they seemed to be closer to an 8 grade level.

Training was primarily on the job. Sit down, didactic sessions suffered from time shortages, short attention spans, and the frequent need to translate into two languages. Attendance was also spotty. Attention was better, as it is with all of us, when the students had their hands on the equipment.

The students readily mastered daily temperature checks on the vaccines, and proper IM injection technique. On our arrival however, when we were assured that two of the students "knew how to give injections", we found that they aimed for the mid-buttock, just at the level of the sciatic nerve, and had no idea how to properly sterilize equipment.

Imojets were used for the first round of vaccinations in the Bashgul. The heads were boiled each morning for 15-20

minutes in a special teapot, a spoonful of vinegar having been added to the water to precipatate out the salts. After each session the heads were disassembled, cleaned in water and greased with silicon. The students were very excited over the imojets, and they were eager to demonstrate their abilities, sometimes without sufficient practice. Shortly after the students took over responsibility for assembling the imojets, one was misassembled primed, jammed and then frozen closed for over a week until a way could be found to unjam it.

Especially with the younger students, the interest in gadgets and giving shots did not extend to the more mundane aspects of the program. Two students did not master registration of the population in a systemic and reliable manner. Daily tasks such as temperature checks and boiling equipment were understood by the students, but would be done only when specifically told to do so. Getting the students to assume responsibility for daily repetitive tasks was not very successful.

A particular problem was syringe disposal. We used all disposible syringes, burning them at the end of each session. We frequently witnessed men approaching a student going off to burn the syringes to request a few "just for the animals". Although there was no intellectual problem in the students understanding why dirty needles should not be reused, in practice, they cannot resist the pressures of their society to hand them out.

When we went on to the Parun valley, our students from the Bashgul did not go with us. They were afraid of the different tribes, and also, with good reason, of what their own people would do once they returned. Likewise, the student from Parun valley was constantly questioned and sometimes harrassed by the population of the Bashgul. The lack of acceptance of "outsiders" was especially manifest with regard to purdah.

Clearly, from the above discussion, we were disappointed in our efforts to train vaccinators. Three of the students achieved no real level of competancy. The problem was not in understanding, rather, it was a lack of maturity, compul-

sivity, and initiative--coupled with a powerful closed society applying pressure to perform dangerous medicine that, realistically, a mere individual has great difficulty resisting. Almost certainly, the three less competant students will still make use of their experience with the foreign team to "practice medicine". Of course, totally untrained people are handing out meds all over Afghanistan and in many other parts of the developing world. However, I am afraid that more harm than good is done by these practioners, and it bothers me to have now provided ours a certain "cloak of competance".

The good news is that one student, the one in his late 20s who had really completed 12 grades, did develop a level of competancy. Although he would require more training, he is one potential future vaccinator. In addition, Mohammad Ali, the Nuristani "Minister of Information", and Abdul, our Kalash manager, who are in their mid-thirties, both mastered the vaccination process, and could be relied upon to carry out an effective program. Unfortunately, both have other duties and are not interested in becoming future vaccinators.

In conclusion, it was the impression of our team that, if a short period of training (2 mos or less) is to be successful in developing competant vaccinators capable of functioning independently, then the people chosen must be mature, compulsive and starting from a high educational level. If the only available students are young and have less than a high school education, then a more extended course of study is more appropriate.

In areas such as Nuristan, where there has been considerable "brain drain" and where the original population had a very poor educational base to start with, most students will need longer training before they can function independently in a safe and reliable manner. In addition, the likely role the community will assign to them, that of healers, cannot be ignored. For this reason, it is most prudent to offer vaccinator training to adults who have received or are receiving other medical training.

Another alternative is to send minimally trained vaccinators to areas where they can work in association with and under the supervision of already existing health care teams. In this setting, vaccination services can serve as an extension of the existing health network, the work can be overseen, and the vaccinator, having a referral center available, will be less tempted to overstep his level of competance. Of course, although there are many groups striving to alter the situation, in rural Afghanistan today, there are very few existing medical networks.

If self-destruct, non-reusable syringes become available, are cost-effective and can be implemented inside of Afghanistan (hopefully by late 1988), they should go a long way in helping prevent the more dangerous effects of the uncontrolled "medicine" that goes on inside. If this type of syringe can be implemented, then training large numbers of vaccinators in shorter courses becomes not only feasible, but also more responsible. One of the most dangerous effects of uncontrolled medical practice, that of syringe reuse with the concomitant risk of possible AIDS and other disease transmission, will be prevented.

PROBLEM AREAS AND SUGGESTIONS FOR THE FUTURE

Relief and developmental work in Afghanistan is frought with special difficulties. The war, the geography, the tribal culture with its ancient divisions all pose special problems for this country which is one of the least developed in the world. Mounting cross-border aid without the benefits of an organized government infrastructure, without transportation or communication networks is an enormous challenge. Problems can occur on a daily basis and are frequently large scale. This section will touch on a few of the more common & bigger problems, and when possible offer suggestions on how to deal with them.

Delays occur almost everywhere and with every group. In the Nuristan project, nearly 4 frustrating months separated our first attempts to get in from our final successful entrance. Although this delay is remarkable, other groups have waited longer, and some missions have been scrubbed entirely due to delays. Repeated attempts to mount a mission, and periods of waiting add enormously to the overall cost, representing a huge unseen sink for funds. The causes are multiple. Because transport depends on Afghans, their experience, or lack of it, are key factors. Also their sense of time and scheduling are very different from our own. The same individual or group may be responsible for all the transport in a region. As such they may place higher priority on arms or other material transport than humanitarian. Additional factors are political instability due to the war or to resistance infighting that affect either the region or the route; and in many areas, the weather.

To illustrate, here is a summary of our attempts to get into Nuristan. In November 1986, after discussing the possibility of mounting a vaccination campaign with the Amir and getting his pledge of support, two or three local representatives were met with to discuss the possibility of entering Nuristan during the winter. Assurances were given that a team with equipment

SUMMARY

A team of three expatriates, one nurse and two doctors, crossed into Nuristan the end of June, 1987. After a four month delay caused by the weatner and logistical and political problems, we were finally able to get into Afghanistan, carrying 1500 kg. of medicines and supplies over a pass of 4600 meters. Animals could not be used due to weather conditions, thus necessitating the use of about 60 porters, who carried supplies in several batches.

Once in Nuristan, medical services were provided in two separate valleys. The team frequently split up for short periods to extend service to more areas in the time that was available before the passes closed again in the fall. In all, approximately 6000 patients were seen, and 5500 women and children were vaccinated. Children received innoculations against diptheria, pertussis, tetanus, polio, (combined in a tetravalent vaccine--DPPT), measles and B.C.G.; while all females under age 45 received tetanus vaccine to protect newborns against neonatal tetanus.

Once inside of Nuristan we found that a measles epidemic was just finishing. We did a survey in 11 villages, and found that over 250 kids had died--about 14% of the children under age five. Nuristan has an under five mortality rate of about 40%. Perhaps a third to a half of these deaths could be prevented by full vaccination. Full vaccination means three separate doses, but in the case of measles--which kills about as many kids as all the rest of the vaccine-preventable diseases combined--a single dose confers lifelong protection.

The valley just next to our target valley had not been hit with measles, so we decided to change our program, vaccinating only 1300 persons in the original area twice, and then carrying on into the next valley where we could use the measles vaccine and prevent a similar tragedy to the one that occurred in our target valley while we were stranded in Pakistan trying to get inside.

could cross a low southern pass into Nuristan with the help of the Dawlet even in mid-winter. The pass discussed had been crossed by a medical team in February a few years earlier. On this basis a mission was mounted.

The expat. team arrived in Pakistan in early February. Upon arrival the Dawlet office in Peshawar was visited. We found that the representatives had changed, and knew nothing of our planned mission. In addition they told us that the Dawlet did not control the pass in question and they could not guarantee our entrance into Nuristan until the higher passes opened in June.

Thus, we initiated contact with Jamiat and Hezbi (Gulbaddin). Both groups had access to the region. Jamiat travels through Nuristan to get deeper inside and so has agreements with Dawlet. Hezbi is very influential in southeast Bashgul, and controls the entrance just next to the garrison of Barikot. The political officers with whom we had contact in both Jamiat and Hezbi were helpful and introduced us in short order to their respective commanders in the area. Both commanders were eager to help a medical team go inside since our team would offer services in their area as well as the adjacent Dawlet area.

We chose to go with the Jamiat commander who said he had 100 men under his control, rather than Hezbi, because relations between Jamiat and Dawlet are better, and we were afraid that once in a Hezbi area they would not actually allow us to leave and enter the Dawlet area where we wished to go.

The team and equipment were moved to Chitral in early March. Severe weather--the worst the area has seen since the beginning of the war, forced two team members to walk over a pass fromm Peshawar to Chitral that was closed to road traffic, and caused us to rent a private plane to get one ton of equipment in place on time. The Jamiat commander arrived one day after the team and equipment, but arrived saying that he had only 4 men at his disposal, not 100--just like that, no further explanations were offered.

In addition, at about that time we received word that

the DRA had sent two Nuristani government agents into the region --which had recently been bombed, with the aim of getting the area to go over to the government side as part of "national reconciliation". Also while in Chitral we were told that the Hezbi commander we had been offered was a clandestine agent of the government. Although such reports cannot be confirmed, obviously it added to our doubts.

At that point, blocked by record setting rains and political dead-ends, the first team was sent back to Europe, while Abdul and I continued our efforts to organize an entrance.

The above history probably conveys the difficulties sufficiently well so that other details are not really necessary. So, suffice it to say, that contact was also made with NIFA, only to find that their commander was a member of a family that had been expelled from the area due to tribal war; the border police apprehended 12 of our bags that were crossing close to Barikot via an independent transporter. Amazingly, the bags were later released to Abdul. Other bags and receipts were lost in flooded rivers during torrential rains. Not to be forgotten were "secret agents" who caused problems by intimidating transporters and tipping off the police. We finally decided to quit trying and just wait until the high "Dawlet" passes opened--which they finally did after much delay due to bad weather.

Thus, after all this, sponsors sent another team from Europe. In the third week of June, with a combination of 35 porters organized by Mohammad Ali and sent out from Nuristan by Amir Afzal, plus 17 independent Kalash transporters arranged by Abdul, we were finally able to make our crossing over a 4600 meter snowy pass into Afghanistan. The six kilo opium bust which happened the night before our departure which caused us to change passes literally at the last moment, and the border guard who happened to hitch a ride in the same jeep I had rented in my birka are not even worth mentioning.

What can be done to deal with the problem of delays? First, realize that a certain number are inevitable. In Afghanistan, more than in other areas, expatriate team members need to have a flexible, extended period of time free. The team leader needs to be in place in advance of the team arrival, and needs to address all details of the current political situation and as much of the logistics as is possible.

In addition, it must be realized that statements and promises from the vast majority of local groups and individuals mean very little indeed. Saving face, or looking competant or powerful to their local peers is much more important to most Afghans than carrying through on promises made to westerners. Of course there are exceptions to this, especially with more sophisticated individuals. However, except where long experience with a particular group or individual has proven otherwise, it is best to entertain all promises or guarantees made with a high degree of skepticism.

As is quite apparent from the above description of our attempts to get into Nuristan, everything must be cross checked and investigated carefully. Still, in the conditions of war, with the constantly changing circumstances and in the absence of a government, delays are inevitible, should be expected and planned for.

Managing <u>logistics</u> is another serious problem in Afghanistan, and one that also contributes to delays. Although Afghans have expertise in transporting their own materials, they lack necessary experience in the special requirements needed for the transport of medical materials. Traditionally, animals transport small flexible packets of foodstuffs or household materials in saddlebags. Medical supplies are frequently in square metal boxes to protect them from rain. These are very difficult for the animals to manage, as good pack saddles do not exist. Delicate materials such as generators or refrigerators have to be protected against knocks or falls or spills in rivers. The sun and heat exposure are often important.

Managing a tight transport schedule, as is necessary with vaccines, can be critical. Animals must be found and either rented or bought. In either case they must be fed and cared for. Finding fodder and conscientious horsemen is always difficult; profiteering and inflation are constant unwelcome companions--as in all wars.

In areas where motor transport is not possible, the problem of logistics is best handled by having a full-time experienced person especially hired to manage this task. He should not have other responsibilities. Logistics is really a full time task which is frequently overlooked, cannot be managed by horseman, and thus becomes a daily thorn in the side of the entire team. Successful management of logistics is essential to prevent recurrent delays and unnecessary stress in the team, and between the team and the local population.

Another problem that must be dealt with in Afghanistan is the political situation. This has many aspects. First, there is the relative lack of organized leadership within resistance controlled areas of Afghanistan. Even where military leadership is well established and relatively professional, this very rarely extends to social and community organization outside of the immediate exigencies of war.

Medical or developmental projects will be most successful in areas where the political situation is stable, and where the leadership is strong and committed to developmental work as a priority. If a strong leader commands his people to come for vaccination, response will be greater, and the program more successful. If the leader is sufficiently organized and committed to also provide logistical support to the developmental team, then their work will be much easier, and the chances of a long-term or permanent developmental program being established will be much greater. One of the goals of most cross-border work is to provide some kind of permanent developmental network, but this is rarely possible due largely to the relatively unstable political situation.

Another aspect of this problem is the constant flux of the political scene. Even the most carefully planned and well

thought out mission can fail if either the target area or the area through which the mission must travel has become unstable. Bombardments or actual battles with the government of the DRA are the most obvious examples and are usually well publicised and easy to find out about, even in Pakistan or Europe. Much more difficult to gauge, but equally important to the success or failure of a mission, are tensions between various resistance groups which may erupt into ambushes or outright battles, tribal warfare, or clandestine government infiltration and destabilization of a liberated area, or the influence of other groups, such as the anti-western fundamentalist Wahabis.

For instance, in the Bashgul valley of Nuristan, the area has been under the control of a single leader for six years. It has a stable government with many functionaries, but there is little evidence of work that gets done in terms of community services. Although our vaccination project only took place as the result of a preliminary mission during which a vaccine program was agreed to by the amir, and received his pledge of support; when the program actually took place several months later, the situation was quite changed.

The government assisted us in moving in our supplies, thus, we felt, signalling their support for and willingness to participate in the realization of the mission. However, two days prior to our arrival, unknown to us, and perhaps also without notifying the amir, six fundamentalist Wahabi representatives from the middle east had arrived. Nuristan is a region that receives a large amount of its support from these groups. The Wahabis have had considerable success in influencing the behavior of the population (changing the style of prayer, for instance).

During my first trip, no representatives of the fundamentalistic middle eastern financiers were present, and the population and government welcomed a plan for an expanded western medical mission designed primarily to serve women and children.

However, the unexpected simultaneous arrival of our team and the Wahabi representatives caused an enormous problem in

the area. It was clear that pleasing the Wahabis was very important to the local government. They brought money, and were aggressively hostile to westerners. We suddenly found our position in Nuristan completely eroded: we were not even received by the amir for the first three weeks of our trip, logistical support and lodging were intermittantly given then withdrawn for no apparent reason, and extremely minor infractions of purdah suddenly became raging issues. We were repeatedly physically threatened by some of the Wahabis, who were trying to force us out. We were often defended and protected by the villagers, but never by the government. Thus, due to a quirk of fate, but a quirk that is not a rare event in this country at war, our work was rendered much more difficult; in fact, we were lucky that the mission did not fail entirely.

Experiences such as ours are not isolated or unique, many other western groups have experienced various forms of political instability which has interfered with, and sometimes prevented the realization of projects.

The unstable political situation in Afghanistan is a problem area over which we have little or no control. Of course, having the most complete and current information, and if possible from multiple sources, is very useful. In addition, when organizing a mission, obtaining written statements from the host government will often carry more weight and be more likely to be honored than verbal pledges. Also, every effort should be made to work in areas where the leadership is dynamic, interested in the welfare of the population, and willing to participate actively in developmental work. If possible, a backup, alternative area should also be planned for, in the event that instability in the primary area renders the project unfeasable, so that the entire project does not depend on events in a single area.

STATISTICAL REPORT

BACKGROUND: One of the least developed countries in the world even prior to the war, there has never been extensive epidemiological information available concerning rural Afghanistan. The war has caused almost a complete stoppage in the collection of demographic and health statistics. However, this information is vital to assessing the effectiveness of health care programs, and gives important direction to the planning of future work.

The data presented here was collected by non-professionals, not trained epidemologists or statisticians. In addition, our time and energy were quite limited. Nevertheless, some useful information can be obtained.

SCOPE: The enclosed first report on Nuristan contains information on prevalent diseases as well as maternal and child mortality. The information collected during the second mission was designed to complement that of the first. Since the primary purpose of the second mission was a mass vaccination campaign, collecting demographic information to assess the percentage of population covered was a priority. The recent occurance of a measles epidemic provided us with an opportunity to collect some current data on that disease. For several reasons we chose not to keep detailed records of the approximately 6000 persons that we saw in sick-call sessions.*

METHOD AND ERRORS: Demographic information was collected by a team member working with a local representative in each of 16 villages. Each house was visited, and generally a member of the household would serve as informant. In some cases, however, when the family was not at home, or was spending the

* Other groups have collected this type of information more accurately than we were able to in our quick passage from village to village. Most of our patients were curious locals who were not acutely ill. They were seen quickly and received analgesics, verifuges, vitamins or iron. We decided to offer sick-call as a means of increasing public confidence and encouraging turn-out for vaccination. Keeping records on patients' complaints is time consuming, and probably would not have contributed meaningfully to an understanding of disease prevalence.

summer on an outlying farm, information would have to be obtained from a neighbor or from the village representative. Each informant was questioned regarding the number of family members, the number of children and their ages, whether they had had measles, and for children who had died, how long they had been sick. In many villages, families were also questioned about whether they lived in the village or on a farm during the summer, and whether they had brought their children for vaccination. Due to the constraints of the society, information was not collected on the number of women of childbearing age, and whether or not they had come for vaccination. All persons vaccinated were first recorded in a central register. Data on the percentage of the population coming for vaccination was derived from a comparison of numbers vaccinated to children under six recorded during the population survey.

The statistics are skewed in the direction of showing a higher percentage of coverage. While most of the population lives in the villages, going out to the nearby fields and returning at night, perhaps 10-15% live full-time on their farms. These people were not counted in the village population survey, but may have walked into the village for vaccination, thus affecting the statistics.

Another source of error that was apparent to us was in determining chronological ages in the population. Although parents seemed to know their children's ages quite accurately when the kids were less than a year old, the determination of ages in older children and women was unreliable.

The measles survey over reports the true incidence of measles in children less than 6 months of age. The presence of maternal antibody in infants protects them, and it is extremely unlikely that more children died in the under 6 months category than in the 7-12 months category. Although many parents claimed that their young infants who died had a characteristic rash, the presence of a rash was not asked about systematically, and probably many of these children actually died of other causes, such as unrecognised neonatal tetanus or pneumonia.

RESULTS:

1) MEASLES SURVEY: A survey of 16 villages (population: 6765) demonstrated that measles attacked virtually 100% of the susceptable children. This epidemic followed the typical pattern: practically all children older than one year who had not been previously exposed came down with measles.

Of the 1904 children who became ill, 266 of them, or 14%, died. (Charts 1 & 2). Mortality was highest in the youngest age groups: children less than a year of age had a case fatality rate of over 40%. For children 1-2 years of age it was 33%, while for older children the disease became much less severe, with fatality rates of 12% for 3-4 year olds, and 6% for older children. (Chart 3). The average duration of illness in fatal cases was 1 to 2 weeks. (Chart 4).

Although measles normally strikes every 2-3 years in most unvaccinated third world populations, in Nuristan the interval is much longer. In a couple of villages, many children up to 12 years of age became ill. This long interval is most likely due to the geographic isolation of the villages, and tends to protect the population, as age and case fatality are inversely related.

DEMOGRAPHIC AND VACCINATION SURVEY: Population counts were done in 11 villages--representing about one-third of the villages in which we worked.

In the 11 villages studied, approximately 90% of the target children were brought for vaccination. The exact percent of target women who came for tetanus vaccination on the first round is unknown however, because the number of females under 45 years was not asked for in the population survey. Making an estimate based on derived data, it appears that the percentage of women vaccinated in the first round was also very high, in the range of 90% or higher.*

Unfortunately, the levels achieved for the second round were much lower: 50% for children, and 45.8% for women. Charts 5 & 6). The reasons for this were multiple. Most appar ent to us were:

1) Timing: the second vaccination session occurred during harvest.
2)Lack of comprehension of the purpose of vaccination: not understanding prevention, the people expected to feel better after the shots, but some actually felt worse.
3) The novelty had worn off: the villagers were less curious about our presence when we returned the second time.
4) Fears that the vaccinations might be harmful: in one village, 2 or 3 miscarrages occurred after our first visit, and there, <u>no one</u> came for second round vaccination.

Tallying the ages of the vaccinees, we found that there was somewhat of a tendency to not bring very young children for vaccination. (Chart 7). The belief that "the shot is too strong for the baby" is common in much of the developing world, and can account for extremely low turnout in babies. We emphasized repeatedly the need for even newborns to be vaccinated, and this probably explains why the number of infants brought to us was only slightly lower than would be expected demographically. The distribution of women vaccinated also appeared to concur to the actual expected age distribution in the population. (Chart 8)

* In the 11 villages the total population was 3782. Subtracting children 6 and under (1264), gives 2518 adults, and if half are women then there are about 1260. 1283 women were vaccinated in these 11 villages. Again, the uncounted people living on farms and coming for vaccination must be considered, thus the true percentage vaccinated is lower than suggested by the figures.

Population studies done in the first valley indicate that about 90% of the target population came for the first set of vaccinations. But for the 13 villages where two sets of vaccinations were done, the return rate was only 46% for women and 50% for children.

The text of this report contains a detailed discussion of the following areas: the region and its population, the planned and actual conduct of the vaccination program, maintanance of the cold chain, community education and mobilization, proper conduct under the requirements of purdah, the vaccinator training program, a discussion of problem areas and suggestions for the future, and a statistical report.

For a more detailed discussion of the medical and logistical aspects of vaccination, see the enclosed Vaccinations in Afghanistan. For a more detailed description of Nuristan and the incidence of disease there, see the enclosed Regional Report: Nuristan. Where discrepencies exist, this final report should be considered the most accurate.

CHART #1

MEASLES INCIDENCE AND CASE FATALITY BY VILLAGE

VILLAGE	# OF FAMILIES	POPULATION	# CASES MEASLES	# OF DEATHS	CASE FATALITY
1i MANDAGAL	157	938	259	54	21%
2. BAMANDAGAL	34	219	50	8	16%
3. PAPRUK	149	851	355	65	18.5%
4. POLYRUSTAM	37	200	74	4	5%
5. CHAPO	62	309	62	6	10%
6. AULIGUL	29	208	70	3	4%
7. BARGAMATAL	164	969	215	12	4.6%
8. CHITGUL	97	573	127	11	8%
9. APTSAI	62	403	95	7	7.4%
10. PESHAWAR	79	466	128	30	23.4%
11. DIWANABABA	27	176	75	9	12%
12. ATTETI	?	174	50	7	14%
13. AZOOK	46	286	82	7	7%
14. GUNDILUKSHAL	51	450	129	25	18.5%
15. LULUK	38	284	66	13	20%
16. PTCHIGROM	40	259	67	5	7.4%

CHART #2

OVERALL MEASLES CASE FATALITY

IN 16 VILLAGES IN NURISTAN, 1987

$$\frac{\text{\# OF DEATHS ATTRIBUTED TO MEASLES}}{\text{TOTAL \# OF MEASLES CASES}} = \frac{266}{1904} = 14\%$$

CHART #3

MEASLES INCIDENCE AND MORTALITY BY AGE

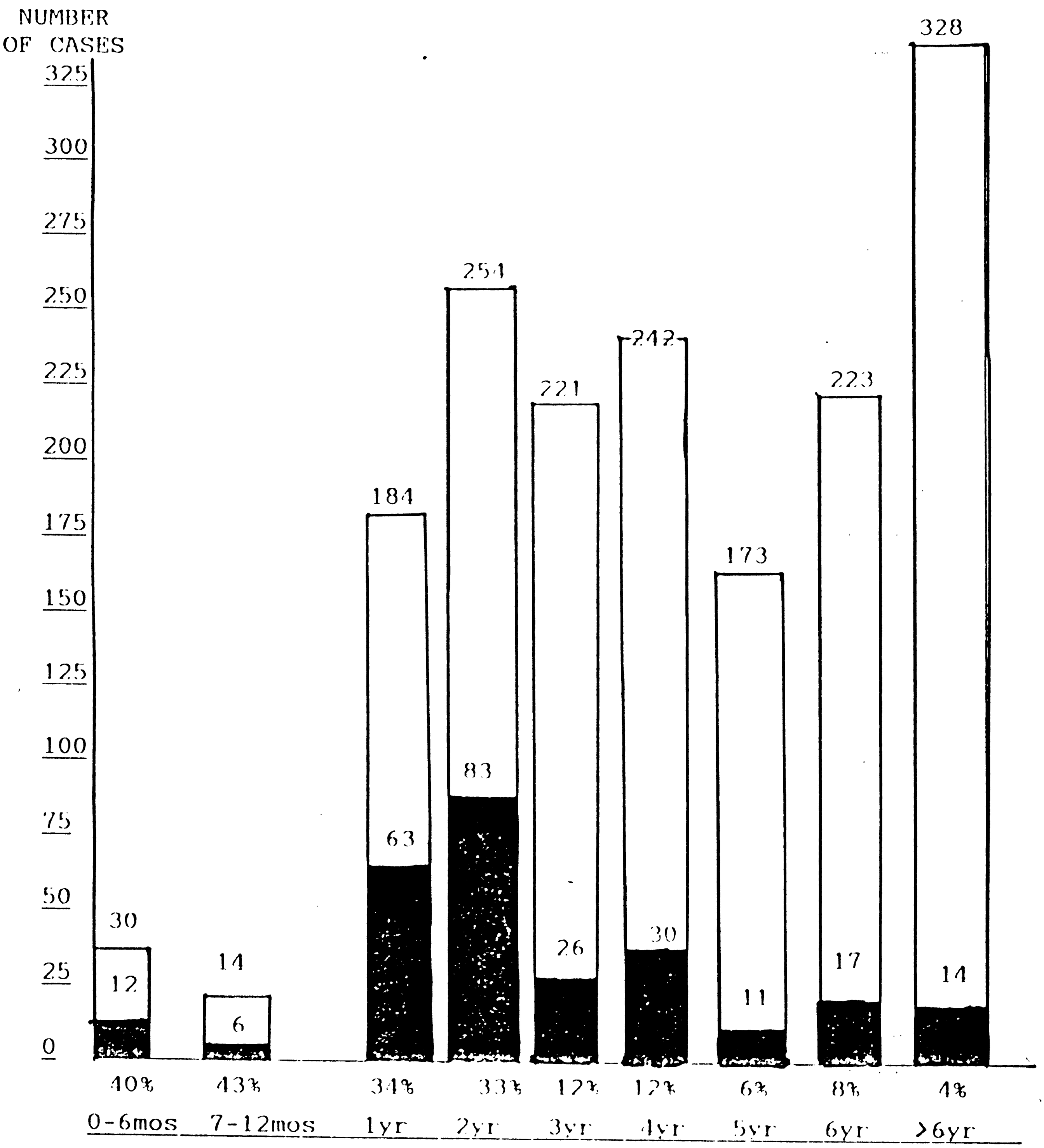


CHART #4

DURATION OF ILLNESS IN FATAL MEASLES CASES

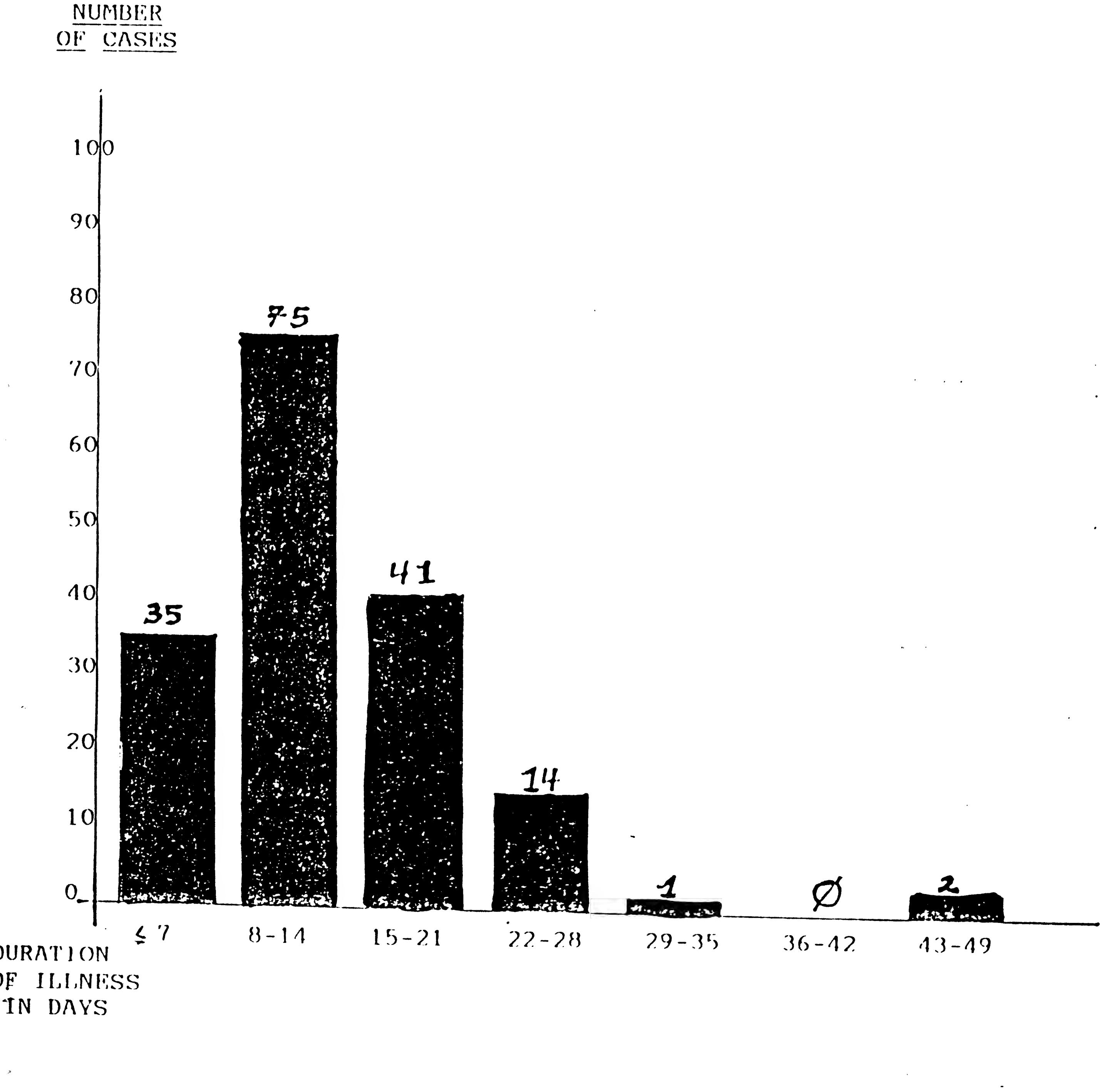


CHART #5

RESPONSE TO DPPT #1 AND #2 BY VILLAGE

	VILLAGE	CHILDREN ≤6 YEARS	DPPT #1	DPPT #2	2nd ROUND % OF 1st
1.	AULIGUL	80	64	34	53%
2.	NIK MUK	?	103	33	32%
3.	BADINSHAW	?	55	41	74.5%
4.	BARGAMATAL	234	195	142	73%
5.	CHITGUL	145	146	63	44%
6.	APTSAI	120	136	90	66%
7.	PESHAWAR	143	121	53	44%
8.	DIWANABABA	80	104	69	66%
9.	ATTETI	52	45	10	22%
10.	AZOOK	119	84	50	59.5%
11.	GUNDILUKSHAL	141	103	25	24%
12.	LULUK	72	78	41	52.5%
13.	PTCHIGROM	78	73	0	0%
	TOTAL	1264	1307	651	50%

Estimated percentage of children coming for first round vaccination: $\frac{1307 - (103+55)}{1264} =$

$$\frac{1149}{1264} = 91\%$$

CHART #6

RESPONSE TO TT #1 AND TT #2 BY VILLAGE

	VILLAGE	TOTAL POPULATION	TT #1	TT #2	2nd ROUND % OF 1st
1.	AULIGUL	208	63	26	41.2%
2.	NIK MUK	?	99	26	26.3%
3.	BADINSHAW	?	57	39	68.4%
4.	BARGAMATAL	969	243	161	66.3%
5.	CHITGUL	573	165	76	46%
6.	APTSAI	403	170	97	66%
7.	PESHAWAR	466	107	36	33.6%
8.	DIWANABABA	176	123	67	54.5%
9.	ATTETI	174	73	21	28.8%
10.	AZOOK	286	103	66	64%
11.	GUNDILUKSHAL	450	73	12	16.4%
12.	LULUK	284	69	30	43.4%
13.	PTCHIGROM	259	94	2	2%
	TOTAL	3782	1439	659	45.8%

CHART #7

AGE DISTRIBUTION OF CHILDREN 6 YEARS AND UNDER BROUGHT FOR VACCINATION

DPPT #1

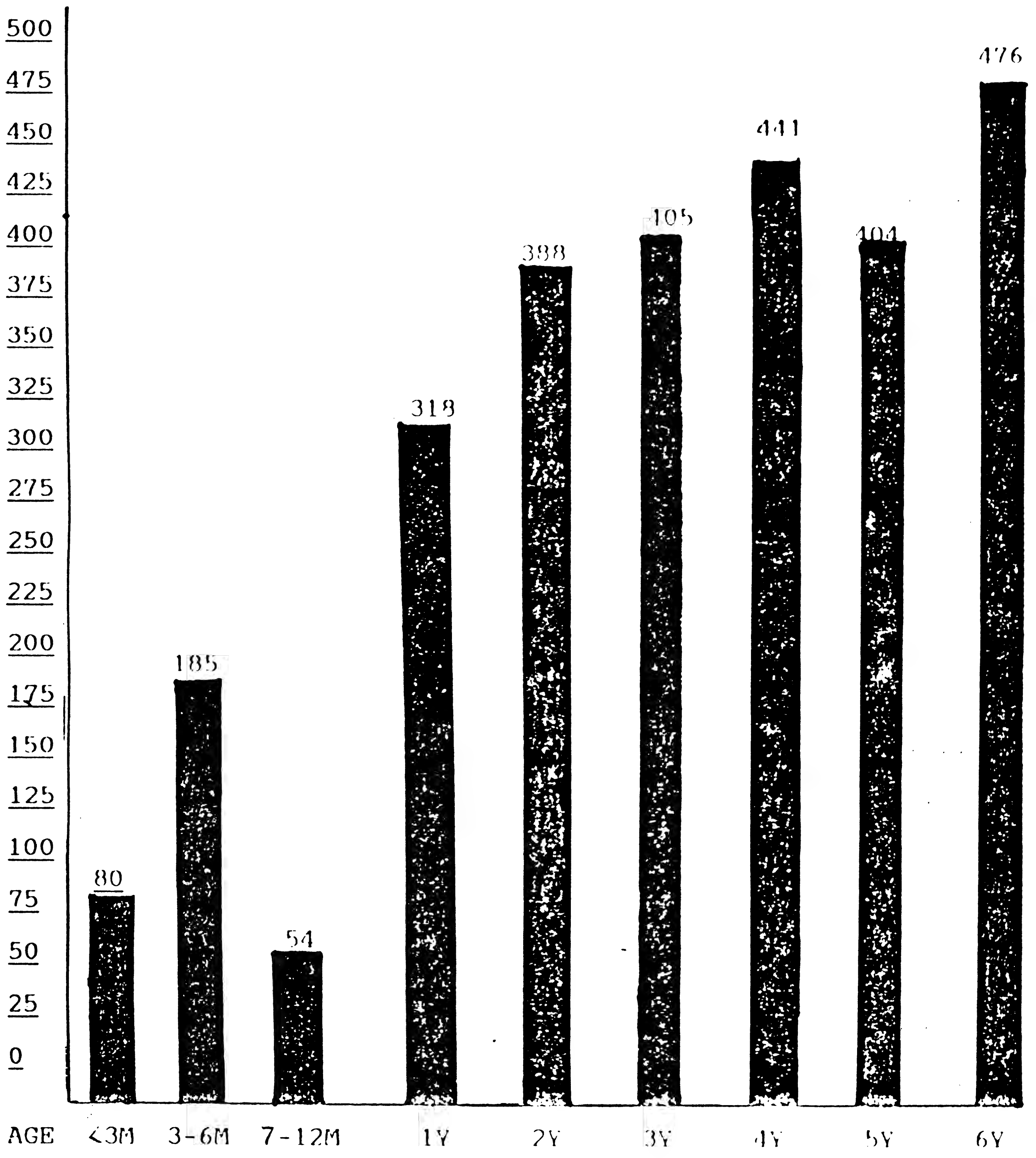
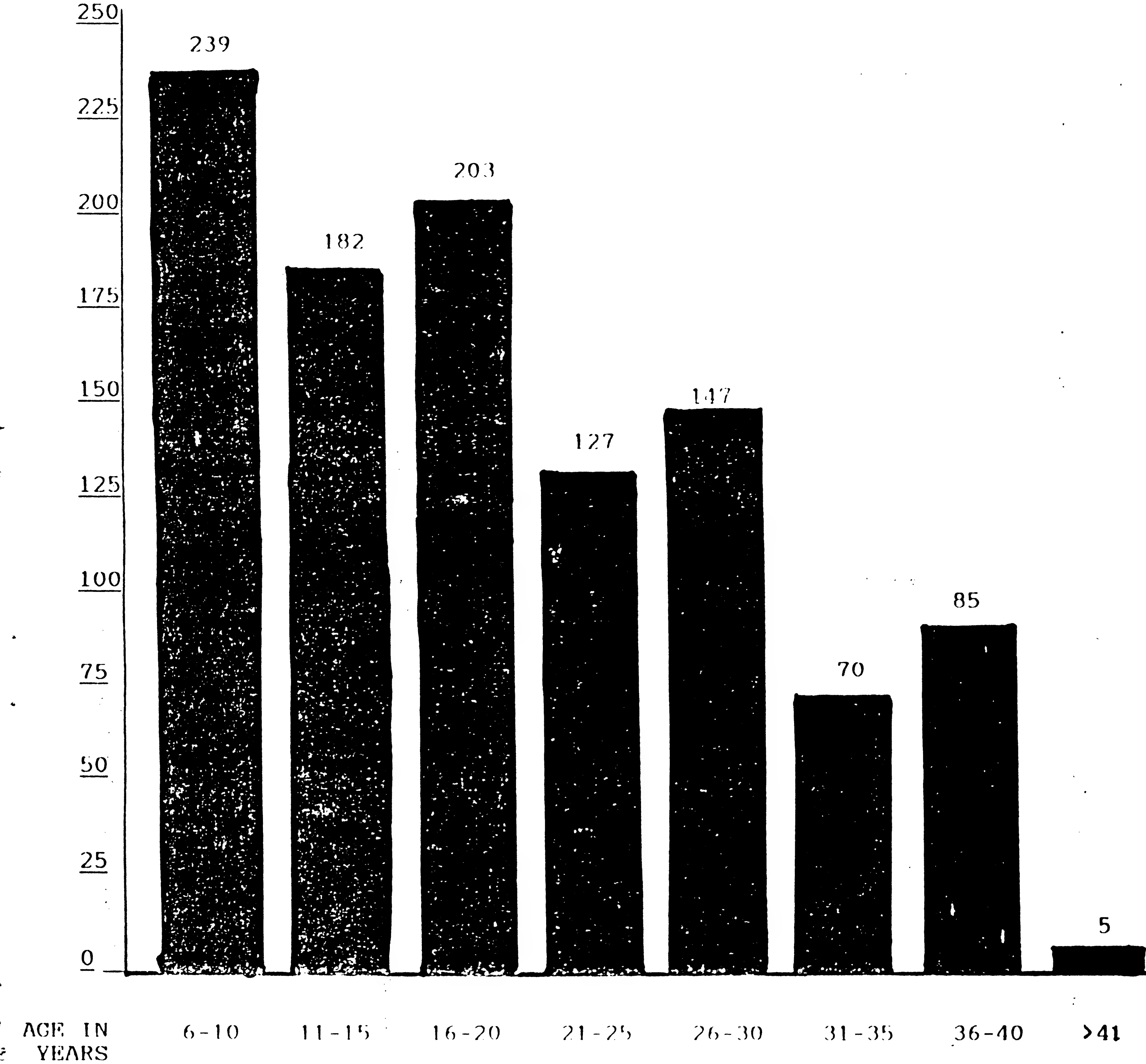


CHART #8

AGE DISTRIBUTION OF 1058 WOMEN RECEIVING TT #1



CONCLUSION

In terms of technical considerations, such as maintaining a cold chain, mobilizing a significant portion of the population and vaccinating them, this mission can be considered a success. With some modifications due to the particular circumstances found in the area, the campaign met its initial goals. We were not able to accomplish a more long-term goal however: the institution of a network capable of providing ongoing services in the future. To accomplish this, working in areas with stable and highly motivated leaders should be helpful.

The events that occurred during this campaign raised many evocative, difficult questions. For instance, what can we do to improve second round vaccination turn-out? In Afghanistan, social, environmental and political factors are more important than medical considerations in choosing the proper time interval between vaccinations.

What can we do to develop a cadre of health care workers who can contribute meaningfully to the welfare of the populations they serve? Our potential for doing unintentional harm must also be carefully examined. This pertains not only to the potential harm of medicines such as chloroquine or dirty injection equipment, but also to more so-called esoteric questions: what impact will vaccination have in areas with a fragile ecosystem and a population extremely resistant to practicing birth control? What impact will health care providers have on the political situation in the area? How can developmental work encourage the growth of responsiblity and independence rather than a welfare "hand-out" mentality?

Another interesting consideration is the relative cost <u>inefficiency</u> of developmental work in Afghanistan when compared to other third world countries. It seems unlikely, given the circumstances, that most missions will be cost-effective in

terms of cost per child vaccinated. Ironically, there is money for Afghanistan now because of the war, hopefully significant assistance will continue if the war finishes.

Developmental work in Afghanistan is important and must continue. Most of the difficult questions posed above have no answer. By asking them I do not mean to discourage others, the questions merely reflect some of the concerns that developed for me during this project. As such, they seem somehow valid to present in a conclusion, and are not meant to offend or discourage the reader, but rather to offer a few considerations that may help in structuring future missions.

THE REGION AND POPULATION

Nuristan is an ethnic region in northern Kunar and Laghman provinces. The indigenous tribes live in the narrow valleys on the southern slopes of the Hindu Kush. They practised an ancient culturally distinct religion with a pantheon of deities until their forced conversion to Islam in 1896. Nuristan was a protected tribal region with restricted access to outsiders prior to 1978.

In 1978-79 the local population rose up against the government, there were some bombardments at the time, and rusted tanks can still be seen south of Kamdesh. There have been no government incursions since 1979, and few bombardments. With the exception of the Kamdesh area and southern Waigul, which have reportedly been about half depopulated, most of the rest of Nuristan is intact, with thriving agriculture and busy villages.

The vaccination program was designed to cover the population controlled by an independent fundamentalist resistance group which calls itself "The Islamic Revolutionary State of Free Afghanistan". Its leader is a mullah who attended madrasa in Pakistan, Amir Mohammad Afzal, who lives in the small village capital of Nik Muk (also called Saidabad or Bud Muk) in the middle of the Bashgul valley. The group controls the entire Bashgul valley north of Kamdesh, and has spotty control of the neighboring Parun valley. The group is probably more accurately described as tribal than political--the people are all Bashgul Katis (see Regional Report: Nuristan, for more detailed description of the area).

For reasons that will be described below, most of the neighboring valley of Parun was also vaccinated. This area is controlled by a mix of Hezb and Jamiat as well as the above group.

Although the people all clearly identify themselves as Nuristanis, tribal differences within the area are still very significant. This is understandable given the geographic isolation of the different valleys: passes of up to 5000 meters

REFERENCES

1. "Simplifier les Calendriers de Vaccination en Afrique de l'Ouest" by Philippe Stoeckel
Carnet de l'Enfance, Vol69/72. 1985 p.343

2. "Diptheria & Tetanus Toxoids and Pertussis Vaccine, Combined" by Orenstein, Weisfeld, Halsey
Recent Advances in Immunization 1983

3. "The Use of Tetanus Toxoid for the Prevention of Neonatal Tetanus in Developing Countries", by T. Stephen Jones
ibid. Ref. 2

ACKNOWLEDGEMENTS

So many individuals have given generously of their time and talent for this project. Services and donations in kind were provided willingly by many persons and groups. But the following stand out.

Hannica and Anders Fange, whose careful questions, advice, and vote of confidence provided the necessary moral support to enter Afghanistan the first time as an unsponsored individual. The early technical and financial support of the SCA made the second mission, the vaccination campaign, feasible.

To Jack Lesar, Moquim Rahmanzai, Al Nehoda, Larry Crandall, , Tom Goutierre and Brad Hanson, many thanks for sharing their expertise and counsel when I was a newcomer in Pakistan.

Philippe Truze gave his unqualified support to this vaccination campaign. He shared freely his technical experience, opened doors for me with his associates and collegues whom he had gained over long years of committment to Afghanistan, and provided invaluable assistance in fundraising.

Thanks to the staff of MSF, especially Juliet Fournot, Eric Laurent, and Didier Lefevre for their technical advice, experience, support and encouragement.

The staff of the Pakistan Chief Commissioner of Afghan Refugees made a special effort in rapidly and efficiently clearing the vaccines through customs and into their cold room. Dr. Shafiq-ud-din, the deputy director of E.P.I., also provided valuable assistance with the vaccines.

Astrid Maack and Bernard Benedetti, members of the "first team" that didn't get in spent long frustrating months working and waiting in Pakistan, finally having to return to Europe without the satisfaction of making it into Afghanistan. Their efforts contributed to the final success of this mission, although they were not able to profit from it themselves.

The attempts of Massoud Khalili of Jamiat, and Qaribul Saeed of Hezbi Islami to help organize our entrance are also appreciated.

Many thanks to Laurance Laumonier for her concern, careful questions and shrewd advice, to Michael Barry for his "letter of transit", to Anke and Rolf Lerch for all the help they gave and their companionship. Thanks to the "Maison Blanche", especially Edouard, Domitille, Xavier and Christian for their friendship, many errands, dinners and coffees. Thanks to Rosanne Klass for her advice, and to Cleo Paturis for her enthusiastic support. Thanks also to the Friesen family for their unflagging interest in helping the Nuristanis, and their many kindnesses to me.

I am grateful to the staff of UNICEF in Pakistan, especially Carl SchÖnmeyr and Dan O'Dell for their support of this program, and their continuing efforts to foster maternal and child health care in Afghanistan.

Rupert Neudeck of the GED provided a much needed security net with his pledge to provide back-up funding if needed. This allowed us to expand the campaign once inside of Afghanistan. His patience and moral support were also much valued.

I am especially grateful to the donor groups for their willingness to give aid in an unconventional way, to a private individual who for technical reasons could not sign a contract with any single organization. In addition, their continued support through the long difficult months of trying and waiting and not knowing whether we would make it in, and their willingness to send in another team, was enormous.

Mohammad Ali and Abdul Khaliq, our local team members, were much more than mere employees. It was only through their constant prolonged untiring efforts that we were ever able to accomplish our entrance into Afghanistan. They stuck with us, protected and defended us in times of danger, and saw the mission through, with all its difficulties, with all their desires to quit, until they had seen us safely back to Pakistan.

Many thanks to the friends in Chitral, our staging area. To Freedom Medicine where we stored our supplies and vaccines, and to Agnes Mallet who looked after them. To Haider Ali Shaw and Abbas of the lovely Chitral Mountain Inn, who fed us, hid

us, and transported us, and raced around Chitral on many occasions filling medication requests urgently needed on the inside.

My family and husband provided constant encouragement and support, even though this mission also meant hardship for them.

And finally, last but most important of all, are Maria Altstidl and Christoph Bernoulli, the German nurse and Swiss doctor who completed the team. A better team could hardly have existed. Thank you friends.

THE DONORS

This medical and vaccination program for Nuristan was made possible due to the generous donations of private individuals and several professional and private voluntary organizations. Contributions were made in personnel and materiel as well as in cash. Actual monetary values are given only when a donation of liquid was made. The total estimated cost of this project was $90,000-100,000 (U.S.). Donor organizations are listed alphabetically.

AFGHANISTAN RELIEF COMMITTEE (N.Y.,N.Y.) Donation of $5000. $1000 was applied towards the purchase of vaccines, and $4000 was used as salary for Dr. Cita ($1000/month x 4 mos.).

GERMAN EMERGENCY DOCTORS (Cap Anamur--Cologne, G.F.R.)

1.) Two team members, their transportation, salaries and living expenses in Pakistan.
2.) The majority of the cold chain and vaccination equipment.
3.) Unrestricted back-up funding which allowed the unanticipated expansion of the vaccination program once inside of Afghanistan. Eventual support came to 1/3 to 1/2 of the total costs inside the country.

MEDECINS DU MONDE (Paris)

1.) Two team members, their transportation, salaries, and living expenses in Pakistan.
2.) 110,000 rupees cash donation in Pakistan.
3.) Additional funding of 20,000-30,000 rupees dispensed by another team member in entrance attempts.
4.) Purchase of additional cold chain equipment.
5.) Medical insurance, and the use of the MDM truck and telephone for work related purposes.

SANTE SUD (Marseille) $5000 towards the purchase of vaccines.

SWEDISH COMMITTEE FOR AFGHANISTAN (Stockholm)

1.) 175,000 rupees cash donation in Pakistan.
2.) 450 kg. donation of medicines and supplies.
3.) Donation of medicines for the first Nuristan trip.
4.) Use of office equipment and administrative support.

UNICEF--Pakistan
$5000 dispensed as 5 months salary to Dr. Cita. (Total time expended on this project exceeded 13 months.)

In addition, a very generous private donor who wished to remain unnamed contributed $10,000, without stipulations, at the beginning of the program which provided the necessary early backing to get it off the ground.

Although he also wished to remained unnamed, another important backer was my husband, who made the first trip to Nuristan possible, and who provided in addition uncounted financial and material support during the second mission.

DISBURSEMENT OF CASH DONATED

The following 26 pages is a detailed list of the expenditure of liquid contributed for the project. The first page contains a coded chart for those who are interested in categories of expenditure. Receipts and photocopies of the original records can be had on request.

The overall totals are as follows:

DONATION	DISBURSEMENT
$10,000	$10,603 (Spent in U.S. & Europe prior to departure)
285,000 rupees	284,300 (Spent in Pakistan & Afghanistan)
	$500-600 (Projected closing costs: documentation & cost of bringing remaining medical supplies out of Afghanistan)

separate one valley from the next. Another key factor in the perpetration of tribal differences over unity is language differences. The Nuristani languages are ancient and bear no relation to Pashto or Dari. In Nuristan itself there are at least 5 different languages, no more related to each other than French is to Italian. In the space of one 7 hour walk, we passed 4 villages speaking 3 different languages--the local people required translators to communicate with each other.

The population in the Bashgul and Parun valleys is probably in the range of 25,000-30,000. Villages are numerous, and frequently built on steep hillsides that cannot be tilled and are an asset to defense. The people are mostly farmers and sheperds, many, perhaps a quarter of the population, have a house or a room in a village where they stay in the winter, and a farm to which they go and work in the summer. Villages are separated from each other by a one to four hour walk on a rocky footpath.

Though the area has not been touched directly by the tragedies of the war, it has been affected economically and culturally. Once very isolated, visitors, even Afghans, requiring travel permits; now thousands of Mujahideen and refugees trek their way through Nuristan. As a result of trade with these travellers, numerous shops, hotels and chaihanas have sprung up. Once supplies came by jeep road from Kabul, now the local men cross passes into Pakistan two or three times yearly to get rice, sugar, cloth, cooking oil, kerosene and other neccessities for their families. Inevitibly, there has been profiteering from the captive market passing through, with resultant inflation. Although outsiders suffer miserably from this, many Nuristanis still exchange goods largely by barter, and thus are not so affected by inflation.

To summarize, Nuristan is a geographically isolated, culturally distinct, agricultural region in northeast Afghanistan. The population is intact and controlled by a fundamentalist independent party as well as traditional tribal customs. This is the area where the vaccination program was conducted.

THE VACCINATION PROGRAM

THE PLANNED PROGRAM AND RATIONAL FOR IT: The vaccination program for Nuristan was conceived after an initial visit to the area and a health survey which revealed an under 5 yr. mortality of 42%. Two villages had described epidemics the winter of 1985 that reportedly killed about one-third of their young children. Classic pertussis symptoms were vividly recounted. In addition, the Bashgul valley had not had a measles epidemic for 6 years, and in the fall of 1986, at the end of the first mission, measles cases were being reported in nearby Chitral, Pakistan. Therefore, it was decided to mount an expanded vaccination campaign for the Bashgul valley on an urgent basis.

A modified EPI campaign was decided upon, giving DPT/augmented IPV, measles and BCG to children 6yrs. and under, and TT to all females 7-45 yrs. Killed ausmented polio (Merieux Labs, France) was chosen despite its greater cost because of stability, ease of storage (it does not have to be kept frozen) and its greater efficacy after just two doses (Ref. 1).

Two vaccination rounds were planned (the maximum that time would allow), the first and the second course separated by a two month interval. This interval was decided on because it was the longest time that we could allow, given the area to be covered and the time constraints imposed by the weather. Since greater seroconversion rates and higher titers are obtained after longer intervals (Ref. 2), and only two doses were planned, the longest interval possible was desirable. It was decided to give measles on the first round, and BCG on the second because of the more urgent need for measles protection, and fears that the side-effects produced by BCG would result in a greater drop-out rate.

Tetanus toxoid was offered to all females under 45 yrs. This seemed more rational in an area without ongoing medical services. Two doses of TT give protection against neonatal tetanus for several years (R. 3). If repeat vaccination can be

carried out in the next 5 years, women receiving TT #3 should be protected for most or all of their childbearing years.

Several hundred kg. of medicines were also brought in, because it was felt that if curative services were not offered, vaccination turn-out or return might be low. The lion's share of the medications were iron, vermifuges, analgesics and trachoma antibiotics. "Preventive" type medicines were emphasized, but were not handed out systematically: only those presenting to the afternoon sick call sessions were given meds.

THE ACTUAL PROGRAM, AND WHY CHANGES WERE MADE: The original program was organized and put together with a great deal of urgency: the goal was to get into Nuristan as soon as possible in order to prevent an epidemic of measles. In this regard the mission was a partial failure. Although a vaccinating team was assembled and ready to make the crossing by March 10, the area could not actually be entered until over three months later, on June 22. This was not from want of trying. Record setting spring rains, political problems in Nuristan, and the inexperience of the local people, on whom we had to rely, in handling "large scale" logistics, were all contributing factors. To name just a few things, floods, blizzards, D.R.A. government agents, Pak. border police and "the casual promise" made by various Afghan groups, as well as our own inexperience conspired against a timely entrance. A significant portion of our funds were expended in unsuccessful attempts to get in with various groups and over different routes. This will be discussed further in the "Problems" section.

Once in Nuristan, we found, as we had feared, that a huge measles epidemic had swept through the entire Bashgul valley, sparing only some farms and one remote village. Despite the fact that we did not arrive in the Bashgul in time to achieve

the initial goal, it provided an opportunity to collect some useful current epidemiological information on measles, and probably contributed to the high turn-out for first round vaccination in the valley. In addition, once inside of Nuristan, we heard that the neighboring valley of Parun had not been involved in the epidemic. Because communications in Nuristan are quite poor, it was only by completeing our first round of vaccinations in the Bashgul that we were able to establish that virtually all the villages had been attacked--we even encountered a few children who still had rashes. To find out more about the next valley, we sent a team member who was from Parun to collect information and see if the people would be interested in hosting a vaccination team. Meanwhile, we started our vaccination round #2. Thirteen villages, (about 2/3 of the Bashgul population), were offered second round vaccination. Overall, coverage rates of only 42% for women, and 50% for children, were achieved.

When our representative returned from the Parun valley he informed us that villages there had not had measles for 2-7 years. Since offering measles vaccine to a population needing it will normally save more lives than completeing DPPT and BCG--even with 100% follow-up, we decided to proceed on into the Parun valley. Other significant factors in our decision were that the government of Amir Afzal was providing us with much less than optimal support (see "Problems"), and the people of Parun valley seemed quite eager to have a vaccination program in their area. In fact, Wama, a very large and well organized village, had raised 50,000 afghanis to help us with our transportation costs.

Thus, to summarize, initially a modified EPI program was planned, designed to provide the most complete coverage possible within practical limitations. It was to cover a single geographic and political area, the Bashgul valley of Nuristan. The program was changed because second round coverage rates were lower than expected, and a recent measles epidemic had rendered that vaccination unnecessary. The neighboring valley which

had not had measles was entered, and TT#1, DPPT#1, measles and BCG were given to an additional 1500 women and children. This was felt to be a more cost effective plan. Additional factors were political instability in the initial region making it difficult for us to operate effectively, and active recruiting (Wama also sent us a representative) and organization in the second valley which encouraged us to modify our program.

THE COLD CHAIN: All of the vaccines were purchased from Merieux Laboratory in Lyon, France. Merieux airfreighted the vaccines on schedule, with close telex communication to Pakistan, on a direct flight from France to Islamabad. Customs clearance was obtained in advance, the vaccines were unloaded within two hours of arrival and placed in the cold room of the Chief Commissioner of Refugees by his staff in my presence. The vaccines were stored for 3 weeks there, then loaded onto a truck in three big Electrolux cold boxes and transferred to Peshawar, where they spent one night and then were flown to Chitral in a plane.

In Chitral, the vaccines waited over three months for transfer to the inside of Afghanistan. During this period they were stored either in the Electrolux cold boxes with ice pack changes as necessary to maintain the temperature below 8°C., or they were stored in a refrigerator. In either case a record of the temperature was kept using an electronic thermometer which could measure temps. via a probe, thus avoiding frequent opening of the refrigerator or cold box.

We were planning to maintain the cold chain inside of Nuristan using an Electrolux cold box/refrigerator which could run off of gas, kerosene, or electricity. Unfortunately, this refrigerator weighed 42 kg. and was bulky. Despite the assurances of our local transporters to the contrary, when it actually came to getting it into Nuristan, we were informed that the width of the box, more than its weight or volume, prevented its transport across a 4600 meter pass by a horse. The animal would not be able to navigate the narrow spots in the mountains.

This we were not told until the actual time when the box was supposed to come inside--despite all of our earlier checks.

Thus, faced with this problem, we decided to ship in only enough vaccines for the first round of vaccinations in the Bashgul, leaving the rest in Chitral where they could be more closely cared for at the Freedom Medicine Clinic. The first course of vaccines were carried inside-28 kilos on a man's back in a large Iffa Credo (Merieux) box. Although less robust or heat stable than the Electrlux boxes that we were planning to use for the majority of the campaign, the Iffa Credo boxes have the advantage of a shape that fits more easily onto a man's or horse's back.

Once inside of Nuristan we were faced with maintaining the cold chain without benefit of a formal refrigeration system. Fortunately Nuristan is a cool mountainous region with summer temperatures that rarely exceed 25° in the shade, where snow persists in avalanches and on mountain tops until September, and where the plentiful springs emerge from the earth at 7°-12°C. We decided to take a chance on maintaining the cold chain for the first round vaccines using just the natural resources available.

As it turned out, we were very lucky. Remembering a technique used by our grandparents to make ice cream on those long summer nights on the farm without electricity, we brought snow down from the mountains and mixed it with crushed rock salt. Snow during the summer in Nuristan is +0.8°C, (surprisingly, its temp. is above freezing). By mixing the snow with salt and spring water (8°C., usually) a slurry was made that, if stirred briskly, would descend to -5°C. This is because saline (water and salt) freezes at -18°C. By mixing snow with salt, saline was created, the snow was melted which is an endothermic reaction absorbing heat, and the temperature of the mixture was thus lowered to below the freezing point of pure water. Then it was a simple matter to place ice-packs filled with pure cold ice water (4°C.), stir briskly, and freeze them. The whole process took 1-2 hours in order to freeze ice for two cold boxes. The procedure had to be repeated every 8 days to keep the ice boxes below 12°-13°C.

23: REPORT OF AVACCINATION PROGRAM (NURISTAN)

REPORT OF A VACCINATION PROGRAM

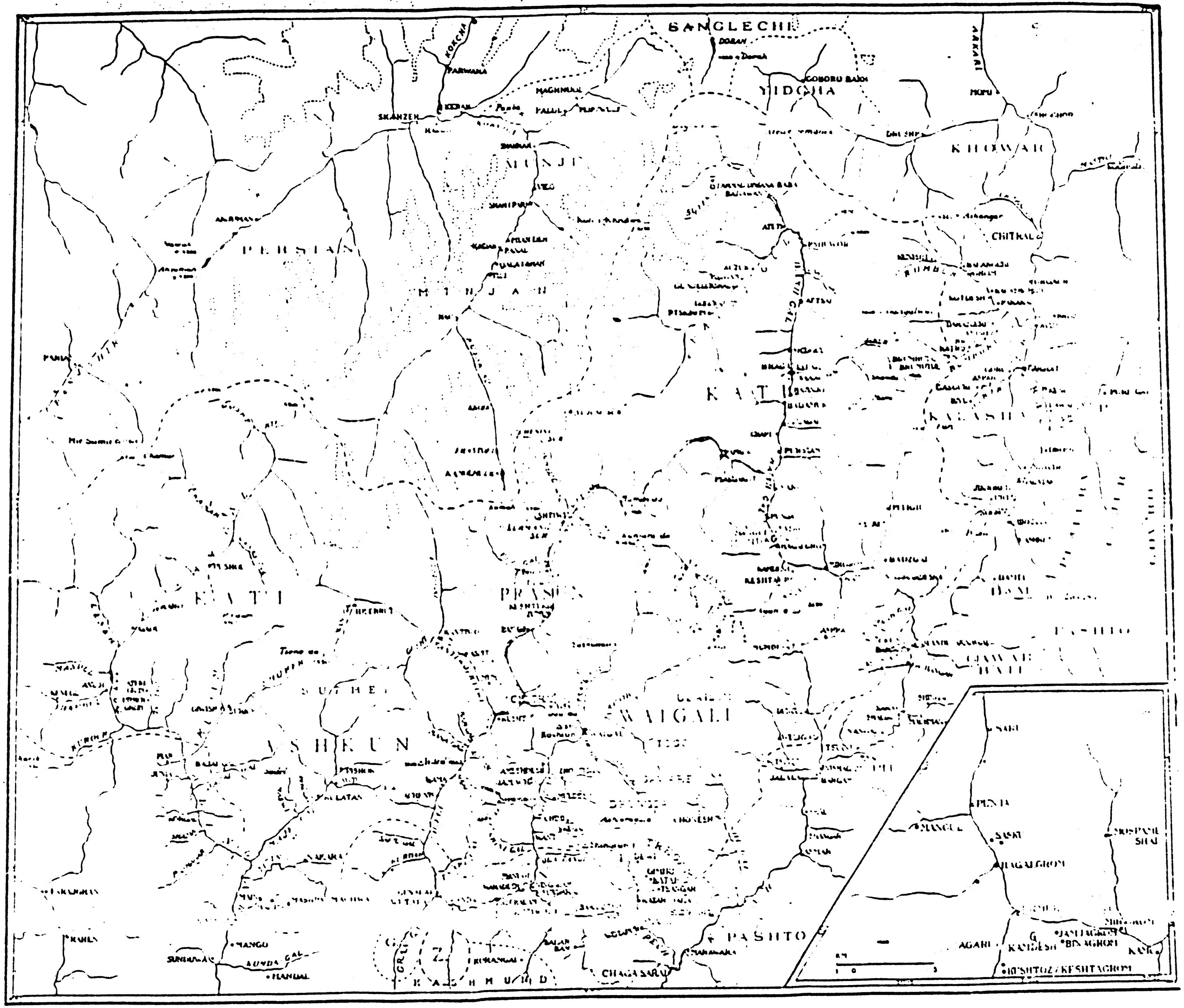
IN NURISTAN, SUMMER, 1987

PREPARED BY

KATHLEEN R. CITA, M.D:

Fig. 277: Map of Nuristan, with linguistic regions. Drawn by Aage Andersen in 1978.

This map and also Fig. 99 (colour) have previously been published in L. Edelberg & S. Jones NURISTAN (Graz 1979)



LUTKUH
Dorah pass
KASH GAL river
DORAH lake
3760 metres above sea level
CHITRAL town
WAIGAL village

KILOMETRES
0 5 10 15 20 25

NURISTAN 1976